Active Research Contracts

94-331 **Title:** EPIDEMIOLOGIC INVESTIGATION TO IDENTIFY HEALTH EFFECTS OF AMBIENT AIR POLLUTANTS IN CALIFORNIA, PHASE III

Contractor: USC **ARB mgr:** HELENE MARGOLIS **Total:** $11,275,483 **Completion Date:** 12/30/03

Objective: The objectives of this study are to: 1) determine whether long-term exposure to ambient air pollutants during childhood leads to changes in lung function or adverse health effects, especially chronic respiratory effects; and 2) quantify the prevalence and severity of the observed effects, as well as the levels of exposure at which effects occur. The study will evaluate 5,400 school children residing in 12 southern California communities, 3,600 of which have already been studied for two years as part of a similar study begun in 1991. (This is a continuation of the work that originated under A033-186)

95-308 **Title:** INVESTIGATION OF ATMOSPHERIC REACTIVITIES OF SELECTED STATIONARY SOURCE VOCS

Contractor: UCR/CE-CERT **ARB mgr:** EILEEN MCCAULEY **Total:** $229,754 **Completion Date:** 5/31/00

Objective: To determine the reactivity of several oxygenated compounds found in consumer products that are suspected of being major contributors to ozone formation.

95-310 **Title:** ENERGY EFFICIENT ULTRA-LOW NOX INDUSTRIAL GAS BURNERS

Contractor: UCI **ARB mgr:** RALPH PROPPER **Total:** $225,000 **Completion Date:** 5/31/00

Objective: To develop technologies necessary to attain and maintain the energy-efficient operation of natural gas burners with ultra-low emissions of NOx.

95-331 **Title:** UNCERTAINTY ANALYSES OF CHEMICAL MECHANISMS DERIVED FROM ENVIRONMENTAL CHAMBER DATA

Contractor: UCR **ARB mgr:** RANDY PASEK **Total:** $157,149 **Completion Date:** 5/31/00

Objective: To determine the environmental chamber parameters and assumptions -- used in interpreting chamber data -- that contribute the most to the uncertainty in the atmospheric reactivity estimates for several important aromatic and oxygenated hydrocarbons.

95-347 **Title:** DYNAMICALLY OPTIMIZED RECIRCULATION COUPLED WITH FLUIDIZED BED ADSORPTION TO COST EFFECTIVELY CONTROL EMISSIONS FROM INDUSTRIAL COATING AND SOLVENTS

Contractor: AIR QUALITY SPECIALISTS **ARB mgr:** RALPH PROPPER **Total:** $286,389 **Completion Date:** 5/31/00

Objective: To modify and existing paint booth recirculation system to accommodate dynamic recirculation and evaluate the utility of adsorbents in a fluidized bed emissions control system.

96-314 **Title:** DETERMINATION OF THE HORIZONTAL DIFFUSION COEFFICIENT FOR USE IN THE SARMAP AIR QUALITY MODEL

Contractor: EARTH TECH, INC. **ARB mgr:** NEHZAT MOTALLEBI **Total:** $94,352 **Completion Date:** 5/30/00

Objective: To improve the coefficient for horizontal diffusion of air in the ARB's SARMAP Air Quality Model, a three-dimensional region-scale comprehensive air quality model that calculates the concentrations of both inert and chemically reactive pollutants by simulating atmospheric processes such as advection, turbulent diffusion, chemical transformation, and removal.

96-315 **Title:** AIRCRAFT SAMPLING TO DETERMINE ATMOSPHERIC CONCENTRATIONS AND SIZE DISTRIBUTIONS OF PARTICULATE MATTER AND OTHER POLLUTANTS OVER THE SoCAB

Contractor: CALTECH **ARB mgr:** NEHZAT MOTALLEBI **Total:** $199,663 **Completion Date:** 5/30/00

Objective: To determine vertical distributions, concentrations, and size distributions of particulate matter (PM) and its constituent chemical species, and to measure parameters related to visibility reduction such as light scattering coefficient above the South Coast Air Basin (SoCAB).

96-316 **Title:** DEVELOPMENT OF MODELING TOOLS FOR MICROSCALE EMISSIONS MODELING

Contractor: CAL POLY **ARB mgr:** HECTOR MALDONADO **Total:** $179,547 **Completion Date:** 5/30/00

Objective: The objective of this project is to develop equipment and modeling techniques for measuring vehicle activity (e.g., individual vehicle type and its average speed and acceleration) so that emissions can be simulated for a specific roadway type (e.g., freeway).

96-317 **Title:** Heavy-Duty Vehicle Fleet Characterization for Reduction of NOx and Particulate Matter Emissions in the SoCAB

Contractor: JACK FAUCETT ASSOCIATES, INC **ARB mgr:** HECTOR MALDONADO **Total:** $199,889 **Completion Date:** 5/30/00

Objective: The objectives of this project are to obtain activity and usage data for all heavy-duty vehicles (HDVs) operating in the South Coast Air Basin (SoCAB), and, based on these data, develop emissions estimates and implementation strategies to accelerate the introduction of low-emitting engines and/or vehicles in the SoCAB.

96-319 **Title:** IMPROVING THE ACCURACY OF MIXING DEPTH PREDICTIONS FROM THE MESOSCALE METEOROLOGICAL MODEL MM5

Contractor: MCNC-ENVIRONMENTAL PROGRAMS **ARB mgr:** JIM PEDERSON **Total:** $92,481 **Completion Date:** 5/30/00

Objective: To improve the accuracy of a meteorological model which is used to process key inputs for air quality models.

96-321 **Title:** AUTOMATIC CHARGING SYSTEM FOR ELECTRIC VEHICLES: DEMONSTRATION PROJECT

Contractor: BEVILACQUA KNIGHT, INC. **ARB mgr:** RALPH PROPPER **Total:** $483,650 **Completion Date:** 5/30/00

Objective: The objectives of this project are to design, fabricate, test, and demonstrate a reasonably priced electric vehicle (EV) automatic charging system that will only require the EV driver to provide an actuation signal in order to charge the vehicle batteries.

96-324 **Title:** AN ASSESSMENT OF THE ENCLOSURES WITH VENTILATION SYSTEMS IN REDUCING RISK AT DRY CLEANING FACILITIES USING PERCHLOROETHYLENE

Contractor: AEROVIRONMENT **ARB mgr:** RALPH PROPPER **Total:** $130,477 **Completion Date:** 4/30/00

Objective: To document the effectiveness of room enclosures with ventilation systems in reducing risk to the public at dry cleaning facilities that use perchloroethylene (perc), and to develop guidelines for the dry cleaning industry on room enclosure design, installation, operation, and risk reduction potential.

96-334 **Title:** DEMONSTRATION OF A DIESEL-FUEL-BORNE CATALYST SYSTEM AND LOW NOX CONTROL TECHNOLOGY FOR REDUCING PARTICULATE AND NOX EMISSIONS

Contractor: SCAQMD **ARB mgr:** STEVE CHURCH **Total:** $225,000 **Completion Date:** 5/30/00

Objective: To demonstrate a system that consists of a cerium-based diesel fuel additive and particulate filter, combined with low-NOx engine emission control technology such as cooled exhaust gas recirculation. Addition of this advanced prototype technology to diesel exhaust systems could assist in the regeneration (restoration and reusability) of particulate filters and in particulate matter (PM) reduction, and would also reduce NOx emissions from heavy-duty diesel engines.

96-335 **Title:** REVIEW AND IMPROVEMENT OF METHODS FOR ESTIMATING RATES OF PHOTOLYSIS IN PHOTOCHEMICAL MODELS

Contractor: UCB **ARB mgr:** JIM PEDERSON **Total:** $182,302 **Completion Date:** 5/31/00

Objective: Improvement of estimates of the rates of photolysis that are used in air quality models. This involves determination of the state of the science in radiative transfer modeling, identification of the uncertainties in existing models, development or adaptation of a state-of-the-science radiative transfer model and methods for preparing input data, assessment with atmospheric observations, and incorporation of the radiative transfer model into selected air quality models.

96-336 **Title:** HYBRID-ELECTRIC PROTOTYPE TRUCK (HEPT) PROJECT

Contractor: ISE RESEARCH, INC. **ARB mgr:** HECTOR MALDONADO **Total:** $350,000 **Completion Date:** 5/31/00

Objective: To develop a series-hybrid electric prototype heavy-duty truck. The auxiliary power unit is a natural gas fueled 6 cylinder 130 hp engine supplying power to a set of lead acid batteries and/or two 230 hp AC induction motors.

97-303 **Title:** Particulate Air Pollution and Morbidity in the California Central Valley: A High Particulate Pollution Region

Contractor: KAISER FOUNDATION RESEARCH INST. **ARB mgr:** HELENE MARGOLIS **Total:** $264,654 **Completion Date:** 2/15/01

Objective: The objective of this study is to evaluate the relationship between exposure to ambient particulate and gaseous air pollutants, and morbidity from selected respiratory and cardiovascular diseases among Kaiser Permanente Medical Care Program members residing in central valley California communities. The project will extend the study region of a U.S. EPA Health Effects Research Laboratory project, which focuses on the Bay Area and southern California, into four large communities located in the central valleys of California.

97-309 **Title:** Historical-Scale Biochemical Markers of Oxidant Injury and Exposure in Pines

Contractor: UCD **ARB mgr:** BRENT TAKEMOTO **Total:** $145,075 **Completion Date:** 5/14/01

Objective: To identify differences in wood biochemistry between ozone-damaged and undamaged trees growing at the same site and differences between trees growing at polluted and clean forest sites along known gradients of ambient ozone exposure in southern California and the Sierra Nevada.

97-310 **Title:** IMPROVEMENT AND EVALUATION OF THE MESOSCALE METEOROLOGICAL MODEL MM5 FOR AIR QUALITY APPLICATIONS IN SOUTHERN CA AND THE SAN JOAQUIN VALLEY

Contractor: SAN JOSE STATE UNIVERSITY FOUNDATIO **ARB mgr:** JIM PEDERSON **Total:** $300,000 **Completion Date:** 5/15/00

Objective: To improve the performance characteristics and range of application of the meteorological model MM5 for air quality studies in California. The investigators will use the MM5 to determine how high pollutant concentrations are formed in layers aloft and brought to the surface during ozone and fine particle (PM2.5) episodes in the South Coast Air Basin (SoCAB) and will simulate wintertime fog events in the San Joaquin Valley and summertime fog events in the SoCAB.

97-311 **Title:** The Formation of Gaseous Nitrous Acid (HONO): A Key Determinant of Tropospheric Ozone and Fine Particles

Contractor: UCI **ARB mgr:** EILEEN MCCAULEY **Total:** $298,271 **Completion Date:** 7/15/01

Objective: The objectives of the project are to: 1) improve and validate current laboratory methods for identifying and quantifying multifunctional carbonyls; 2) examine the role of multifunctional carbonyls in organic photo-oxidation reaction mechanisms; 3) examine ambient samples for hydroxy carbonyls, dicarbonyls, and epoxy carbonyls that have been identified in chamber studies but have not been detected in the ambient environment; and 4) collaborate with ARB to investigate oxygenated multifunctional compounds as markers for stationary sources.

97-312 **Title:** Atmospheric Chemistry of Selected Linear, Branched, and Cyclic C10 Alkane Components of Mineral Spirits

Contractor: UCR **ARB mgr:** EILEEN MCCAULEY **Total:** $83,743 **Completion Date:** 5/15/00

Objective: To analyze the primary products formed from the reactions of the OH radical with three C10 alkanes that will serve as models for the three types of alkanes found in mineral spirits and develop methods for identifying and quantifying secondary products of atmospheric reactions of these alkanes that lead to both ozone and PM2.5 (very fine particle) formation. The model alkanes to be studied are n-decane, 3,4-diethylhexane, and n-butylcyclohexane.

97-313 **Title:** Emissions Testing of a Low-Emitting Two-Stroke Utility Engine

Contractor: UCR **ARB mgr:** HECTOR MALDONADO **Total:** $49,994 **Completion Date:** 5/31/00

Objective: To perform emissions testing of the BKM hand held utility engine which is being developed under the ICAT program.

97-314 **Title:** Development and Application of Improved Methods for Measurement of Ozone Formation Potentials of Volatile Organic Compounds

Contractor: UCR **ARB mgr:** EILEEN MCCAULEY **Total:** $299,720 **Completion Date:** 5/15/01

Objective: To improve the coefficient for horizontal diffusion of air in the ARB's SARMAP Air Quality Model, a three-dimensional region-scale comprehensive air quality model that calculates the concentrations of both inert and chemically reactive pollutants by simulating atmospheric processes such as advection, turbulent diffusion, chemical transformation, and removal.

97-320 **Title:** Development and Validation of Databases for Modeling Biogenic Hydrocarbons in California's Airsheds

Contractor: UCLA **ARB mgr:** ASH LASHGARI **Total:** $258,702 **Completion Date:** 5/30/01

Objective: To produce gridded, speciated, day-specific biogenic hydrocarbon inventories for the entire state.

97-321 **Title:** ADAPTING BIOLOGICAL FINGERPRINTING METHODS TO SOURCE APPORTIONMENT FOR FUGITIVE DUST

Contractor: UCD **ARB mgr:** TONY VANCUREN **Total:** $408,929 **Completion Date:** 12/30/00

Objective: The objectives of this project are to: 1) reduce sample volumes for phospholipid fatty acids (PLFAs) and genetic material (DNA and RNA) to those commonly available in ambient air samples; 2) test the detection and discrimination power of the methods for extracting and identifying PLFAs and genetic material (DNA and RNA) as biochemical tracers of soil organisms and soil microbiotic communities in a set of real and "synthetic" experiments; and 3) compile a database of results for all soils tested.

97-322 **Title:** The Effect of Smoke from Burning Vegetative Residues on Airway Inflammation and Pulmonary Function in Healthy, Asthmatic, and Allergic Individuals

Contractor: UCSF **ARB mgr:** Deborah Drechsler **Total:** $374,825 **Completion Date:** 9/15/01

Objective: The objective of this project is to investigate the effects on human respiratory health of particles inhaled from common sources of smoke produced by burning of vegetable matter, specifically by determining the effects of: 1) an acute exposure at two different concentrations to rice straw smoke on airway inflammation and pulmonary function; 2) total smoke exposure (single vs. multi-day) on airway inflammation and pulmonary function; and 3) asthma and allergy status on airway inflammation and pulmonary function responses to smoke from rice straw burning.

97-325 **Title:** Resuspension of Contaminated Soil as a Source of Airborne Lead

Contractor: UCD **ARB mgr:** TONY VANCUREN **Total:** $99,591 **Completion Date:** 12/30/00

Objective: The objective of this project is to survey the distribution of lead in California soils and provide a methodology for assessing the potential for human lead exposures due to dust from contaminated soils.

97-326 **Title:** The Impacts of Air Quality from Distributed Generation

Contractor: DISTRIBUTED UTILITY ASSOCIATES **ARB mgr:** REZA MAHDAVI **Total:** $98,960 **Completion Date:** 5/31/00

Objective: The objective of this study is to estimate the emissions that could result from the use of "distributed generation" (DG) units, such as internal combustion reciprocating engine/generator sets, gas turbine/generator sets, fuel cells, and other technologies, to produce electricity.

97-329 **Title:** THE HEALTH IMPACT OF NITRIC OXIDE: EFFECTS ON LUNG FUNCTION, CELLULAR AND BIOCHEMICAL PROCESSES IN HEALTH HUMANS

Contractor: UCSF **ARB mgr:** Deborah Drechsler **Total:** $32,880 **Completion Date:** 5/31/00

Objective: The objectives of this project are to: 1) review the basic scientific, clinical, and epidemiologic literature relating to nitric oxide (NO); 2) assess the effects of ambient levels of NO on humans; and 3) evaluate the potential for ambient nitric oxide to cause or worsen human disease.

97-330 **Title:** Indoor Air Quality: Residential Cooking Exposures

Contractor: ARCADIS, GERAGHTY & MILLER, INC. **ARB mgr:** TOM PHILLIPS **Total:** $299,932 **Completion Date:** 12/30/00

Objective: To: 1) characterize emissions rates and resultant personal exposures and indoor concentrations for PM, carbon monoxide, and nitrogen dioxide produced by residential cooking, under typical conditions and realistic worst-case scenarios; 2) characterize emissions rates and resultant indoor concentrations of other cooking pollutants, such as polycyclic aromatic hydrocarbons (PAHs), elements, and potential marker compounds; and 3) measure the effectiveness of selected exposure reduction practices.

98-302 **Title:** Demonstration of a Fast Response On-board NOx Sensor for Heavy-Duty Diesel Vehicles

Contractor: SWRI **ARB mgr:** STEVE CHURCH **Total:** $348,133 **Completion Date:** 10/15/00

Objective: The objectives of this project are to select, calibrate, and demonstrate two types of fast-response sensors capable of providing accurate real-time measurement of exhaust gas oxides of nitrogen (NOx) emissions from on-road, four-stroke cycle, heavy-duty diesel (HDD)-engine-powered vehicles. In order to determine the most appropriate NOx sensors for testing, the contractor will conduct an extensive review of the scientific/technical literature and survey of the most prominent sensor developers and manufacturers of relevant chemical sensing technology.

98-303 **Title:** HEAVY-DUTY GASOLINE TRUCK EVAPORATIVE EMISSIONS TESTING FOR EMISSIONS INVENTORY

Contractor: AUTOMOTIVE TESTING LABORATORIES, IN **ARB mgr:** HECTOR MALDONADO **Total:** $128,691 **Completion Date:** 7/1/00

Objective: The objectives of this project are to procure a fleet of at least 10 heavy-duty gasoline trucks (HDGTs) and test them for evaporative emissions. This project will consist of three main tasks: vehicle selection and procurement, fuel procurement, and evaporative and exhaust emissions testing.

98-304 **Title:** Particle Air Pollution and Cardiovascular and Cardiopulmonary Morbidity

Contractor: UCD **ARB mgr:** Diane Mitchell **Total:** $199,480 **Completion Date:** 10/21/00

Objective: The objectives of this project are to: 1) characterize the air pollution exposures of individuals participating in the CHS study; and 2) determine the nature and degree of association between long-term air pollution exposure(s) to PM, alone and in combination with other air pollutants, and the development and progression of cardiovascular disease and changes in respiratory health. Emphasis will be placed on how the effects of exposure to PM, as it exists in California, differ from the effects of exposure to PM observed in other parts of the nation.

98-305 **Title:** AMBIENT OZONE PATTERNS AND OZONE INJURY RISK TO PONDEROSA AND JEFFREY PINES IN THE SIERRA NEVADA

Contractor: USDA FOREST SERVICE **ARB mgr:** BRENT TAKEMOTO **Total:** $77,569 **Completion Date:** 2/15/01

Objective: The objectives of this project are to: (1) produce maps of summertime ozone concentrations in the western Sierra Nevada from the Tahoe National Forest to the Sequoia National Forest; and (2) prepare maps of ponderosa and Jeffrey pine crown injury risk, based on projected summertime ozone exposures.

98-306 **Title:** Improvement of Speciation Profiles for Aerosol Coatings

Contractor: CAL POLY **ARB mgr:** EILEEN MCCAULEY **Total:** $28,885 **Completion Date:** 5/31/00

Objective: The objective of this study is to identify the chemical speciation profiles for up to 40 aerosol coating products, selected in consultation with ARB. Sampling of each aerosol product will involve separate collection of the propellant and coating. Analysis of the propellant and coating materials will be performed using gas chromatography with detection by flame ionization of mass selective detectors. All coating volatile organic compounds will be identified and quantified, and results will be reported in a format consistent with those used in previous ARB speciation studies.

98-309 **Title:** Development of Reactivity Scales via 3-D Grid Modeling of CA Ozone Episodes

Contractor: UCB **ARB mgr:** Eileen McCauley **Total:** $240,524 **Completion Date:** 4/14/01

Objective: The objectives of this proposal are to: 1) determine hydrocarbon reactivity values using an urban airshed model; and 2) compare the calculated reactivity values to the Maximum Incremental Reactivity (MIR) values used in existing California regulation. A formal sensitivity and uncertainty analysis will also be performed on the urban airshed model-derived reactivity

98-310 **Title:** INVESTIGATION OF LOW REACTIVITY SOLVENTS FOR USE IN CONSUMER PRODUCTS

Contractor: CAL POLY **ARB mgr:** RALPH PROPPER **Total:** $84,315 **Completion Date:** 8/4/00

Objective: The primary objective of this study is to prepare a database of solvent properties designed to facilitate the production of alternative formulations for consumer products. Chemical analysis will also be performed on selected low-reactivity solvents and solvent mixtures to identify and quantify volatile organic compounds (VOCs) present in the product. Consideration will be given to products which are representative of the California marketplace, and special attention will be given to solvents that have low photochemical reactivity. The resulting database will be made available to the public.

98-311 **Title:** Linkages Between Measurements of Multifunctional and Polar Organics in Chamber Studies and the Ambient Environment

Contractor: UCD **ARB mgr:** EILEEN MCCAULEY **Total:** $107,150 **Completion Date:** 4/18/00

Objective: The objectives of the project are to: 1) improve and validate current laboratory methods for identifying and quantifying multifunctional carbonyls; 2) examine the role of multifunctional carbonyls in organic photo-oxidation reaction mechanisms; 3) examine ambient samples for hydroxy carbonyls, dicarbonyls, and epoxy carbonyls that have been identified in chamber studies but have not been detected in the ambient environment; and 4) collaborate with ARB to investigate oxygenated multifunctional compounds as markers for stationary sources.

98-312 **Title:** Microwave Regeneration of Adsorbents and Plasma conversion of VOCs

Contractor: UCD **ARB mgr:** RALPH PROPPER **Total:** $38,054 **Completion Date:** 5/31/01

Objective: The purpose of this study is to assess the effectiveness of microwave plasma on VOC destruction. UCD is studying the regeneration of adsorbent beds through the use of microwaves and gases to purge adsorbed VOCs, and is investigating how VOC destruction is affected by various operating conditions. Several adsorbents and VOCs will be tested, and a plasma torch will be used to destroy VOCs in gas streams.

98-314 **Title:** THERMODYNAMICS OF ORGANIC ATMOSPHERIC AEROSOLS

Contractor: CALTECH **ARB mgr:** NEHZAT MOTALLEBI **Total:** $299,122 **Completion Date:** 6/15/01

Objective: The objective of this project is to develop a state-of-the-science inorganic and organic aerosol equilibrium model for incorporation into a three-dimensional aerosol model. Specifically, the study will: 1) select compound classes important for secondary organic aerosol formation, based on ambient and emissions data; 2) modify current gas-phase chemical mechanisms to include precursors to secondary organic aerosols; and 3) calculate the thermodynamic equilibrium distribution of condensable organics in the atmospheric aerosol.

98-316 **Title:** DEVELOPMENT OF AN EXPOSURE FACILITY TO CONDUCT INHALATION STUDIES TO AMBIENT AEROSOLS

Contractor: UCLA **ARB mgr:** DANE WESTERDAHL **Total:** $557,369 **Completion Date:** 8/30/00

Objective: The objective of this project is to construct and test the performance of a facility designed to create test atmospheres by separating and containing particles from ambient air at specified concentrations.

98-317 **Title:** Testing for Exhaust Emission of Diesel Powered Off-Road Engines

Contractor: WEST VIRGINIA UNIV. RESEARCH CORP. **ARB mgr:** STEVE CHURCH **Total:** $272,525 **Completion Date:** 5/15/01

Objective: The objective of this project is to compile accurate, comprehensive data on off-road diesel engine emissions. Four off-road equipment diesel engines and appropriate fuel(s) will be procured for emissions testing (fuel will be tested to assure quality control). A datalogger will be installed in each of the engines to obtain equipment activity estimates, in order to determine the appropriate transient test cycle(s). Off-road diesel engine emissions testing of the engines will then be performed for oxides of nitrogen, carbon monoxide, carbon dioxide, hydrocarbons, and particulate matter emissions.

98-318 **Title:** QUANTIFICATION METHODS FOR IDENTIFYING EMISSION REDUCTIONS RESULTING FROM SEASONAL AND EPISODIC PUBLIC EDUCATION PROGRAMS

Contractor: ESTC **ARB mgr:** JOANN LU **Total:** $263,811 **Completion Date:** 1/15/01

Objective: To develop a reliable and cost-effective method for quanitfying emission reduction that result from seasonal and episodic public education programs, referred to as Spare the Air programs.

98-319 **Title:** EVALUATION OF TECHNOLOGY TO SUPPORT A HEAVY-DUTY DIESEL VEHICLE INSPECTION AND MAINTENANCE PROGRAM

Contractor: WEST VIRGINIA UNIV RESEARCH CORP **ARB mgr:** HECTOR MALDONADO **Total:** $51,097 **Completion Date:** 6/30/00

Objective: The objective of this project is to have the contractor perform a literature review and engineering evaluation of potential dynamometer system components, including heavy-duty vehicle chassis dynamometers, gaseous and PM measurement instruments, and control and data acquisition systems. The actual procurement of components and assembly into an integrated system would be accomplished in a subsequent contract. Dynamometer and instrument systems that could test both gasoline and diesel HDTs would be investigated.

98-320 **Title:** DETERMINATION OF THE ELEMENTAL CARBON, ORGANIC COMPOUNDS, AND SOURCE CONTRIBUTIONS TO ATMOSPHERIC PARTICLES DURING THE SC CHS

Contractor: CALTECH **ARB mgr:** CLINT TAYLOR **Total:** $94,687 **Completion Date:** 6/15/00

Objective: The objectives of this project are to: 1) analyze all archived quartz fiber filters from the Children's Health Study, from 1994 and 1996-98, for their organic and elemental carbon content; 2) analyze the 1995 quartz fiber filters for individual organic compounds that act as tracers for source emissions; and 3) use the resulting organic compound concentration data to model the source apportionment of the organic aerosol and aerosol mass measured during 1995.

98-322 **Title:** DEVELOPMENT OF SOFTWARE FOR SPATIALLY AND TEMPORALLY RESOLVING MOTOR VEHICLE ACTIVITY DATA

Contractor: UCR **ARB mgr:** HECTOR MALDONADO **Total:** $99,850 **Completion Date:** 5/26/00

Objective: In this project, Dr. Hong Chou at UC Riverside will develop, test, and deliver a software package to perform these spatial and temporal allocations. He will first evaluate the TransCore software for accuracy in map-matching, and then assess the suitability of the TransCore software for supporting the development of a customized GIS software application that would put motor vehicle activity data into four user selectable spatial resolutions: by 5 square-kilometer (km2) grid cells, by county, by air basin, and statewide.

98-323 **Title:** An Investigation of the Relationship Between Total Non-Methane Organic Carbon and the Sum of the Speciated Hydrocarbons and Carbonyls

Contractor: UCLA **ARB mgr:** EILEEN MCCAULEY **Total:** $111,576 **Completion Date:** 5/25/01

Objective: The primary objective of this study is to further validate an instrument designed to measure total non-methane organic carbon (NMOC) through the use of smog chamber experiments. Resulting data will then be used to ascertain whether the ratio of total NMOC to the sum of speciated NMOC varies under conditions of photochemical processing or heavy diesel emissions. Ambient measurements collected during five 2.5-week-long field measurements at different sites in the South Coast Air Basin will also be incorporated into the analyses.

98-327 **Title:** UPDATE AND REFINEMENT OF AN INDOOR EXPOSURE ASSESSMENT METHODOOGY

Contractor: ICF KAISER/SAI **ARB mgr:** SUSAN LUM **Total:** $245,075 **Completion Date:** 9/30/01

Objective: To update and refine the population indoor exposure assessment methodology and verify the accuracy of the improved method. This method is currently used to estimate Californians' indoor and total exposures to air pollution. This project will update the data used to estimate exposure and improve the methodology's efficiency and ease of use. It will also develop and refine estimation processes, including processes to account for indoor pollutant removal mechanisms, and better characterize the uncertainty and variability of the modeled estimates.

98-328 **Title:** WHOLE ECOSYSTEM MEASUREMENTS OF BIOGENIC HYDROCARBON EMISSIONS

Contractor: UCB **ARB mgr:** ASH LASHGARI **Total:** $150,000 **Completion Date:** 7/30/01

Objective: The primary objective is to determine compliance with ozone national ambient air quality standards. A key tool in describing the state implementation plan for compliance is air quality modeling. A critical part of these models is the simulation of biogenic (from-the-plants) hydrocarbons that are efficient ozone-markers. These data will help ARB staff evaluate the performance of these simulations. They would further help to add information to the net effect of plants on air pollution that is a critical need for urban forestry and air quality planning.

98-330 **Title:** CHARACTERIZATION OF THE COMPOSITION OF PERSONAL, INDOOR AND OUTDOOR PARTICULATE MATTER EXPOSURES

Contractor: HARVARD UNIVERSITY **ARB mgr:** TOM PHILLIPS **Total:** $434,929 **Completion Date:** 11/30/01

Objective: To: 1)obtain detailed chemical speciation of personal, indoor, and outdoor PM2.5 samples; 2) examine the relationships among personal, indoor, and outdoor levels of the PM2.5 components; and 3) identify the relative contributions of different indoor and outdoor sources to personal PM2.5 exposures. Monitoring will be conducted in conjunction with an U.S. EPA-funded exposure study of chronic obstructive pulmonary disease patients in Los Angeles. The pollutants will be sampled for 24 hours on seven consecutive days in the summer and winter, for a total of 210 sampling days.

98-333 **Title:** DETERMINATION OF THE 'NEXT GENERATION' OF AUTOMOTIVE REFINISHING COATINGS

Contractor: AVES-AN AFFILIATE OF ATC ASSOC. **ARB mgr:** RICH VINCENT **Total:** $179,495 **Completion Date:** 10/30/02

Objective: To gather information on the availability of automotive refinishing coatings that have less than the maximum VOC designated by the current VOC limits in district automotive refinishing rules, and determine the technical feasibility of applying these coatings by conducting laboratory and field testing. The contractor will also determine what future ultra-low to zero- VOC content formulations can be developed for automotive refinishing coatings. The contractor will also evaluate the feasibility of reducing the toxic air contaminant (TAC) content of these coatings to the greatest degree possible.

98-334 **Title:** INVESTIGATION OF TECHNOLOGIES TO REDUCE EMISSIONS OF METHYLENE CHLORIDE FROM FURNITURE STRIPPING OPERATIONS

Contractor: IRTA **ARB mgr:** STEVE CHURCH **Total:** $99,741 **Completion Date:** 6/20/01

Objective: The objective of this study is to determine the most effective methods for reducing emissions and risks associated with the use of MeC12 or other stripping solvents in wood furniture stripping operations.

98-335 **Title:** PHYSICAL AND CHEMICAL CHARACTERIZATION OF ULTRAFINE AND NANOPARTICLE PARTICULATE MATTER EMISSIONS FROM DIESEL AND GASOLINE ON-ROAD MOTOR VEHICLES

Contractor: UCD **ARB mgr:** HECTOR MALDONADO **Total:** $501,874 **Completion Date:** 8/30/01

Objective: To determine the presence and persistence of ultrafine micrometers and nanoparticle PM emissions from on-road diesel and gasoline powered vehicles. Phase 1 objective is to quantify the presence of ultrafine and smaller particles, with emphasis on physical characteristics such as number of particles and volume concentrations. Phase 2 will attempt to determine both the physical and chemical characteristics of ICE PM emissions with the goals of distinguishing between diesel and gasoline fueled vehicles.

98-338 **Title:** REFINEMENT OF SELECTED FUEL CYCLE EMISSIONS ANALYSES

Contractor: ARCADIS, GERAGHTY & MILLER, INC. **ARB mgr:** RALPH PROPPER **Total:** $124,215 **Completion Date:** 12/30/00

Objective: The ARB wants to refine the analysis for three of the nine fuels studied by Acurex: diesel fuel and liquefied petroleum gas (LPG) for internal-combustion vehicles, and methanol for fuel-cell-powered vehicles. The CEC has agreed to provide data on electricity generation for electric vehicles. The emissions data resulting from this study will be used to compare fuel-cycle emissions for these three fuels to the emissions associated with electricity generation for electric vehicles.

98-340 **Title:** FLUX MEASUREMENTS OF AMMONIA TO ESTIMATE EMISSION FACTORS FOR AREA SOURCES

Contractor: UCR **ARB mgr:** ASH LASHGARI **Total:** $50,092 **Completion Date:** 10/30/01

Objective: To simultaneously measure ammonia emissions using a passive cloth denuder and an active denuder at a dairy, poultry operation, an agricultural field and during fertilizer application at an agricultural field. They will also measure wind speed and direction, temperature, and humidity at these sites during ammonia measurements. CE-CERT staff would use the active denuder measurements and meteorological data as inputs to a box model to estimate emissions factors and to compare with the passive cloth denuder data.

98-341 **Title:** EVALUATION OF NOY AND NITRIC ACID MEASUREMENT METHODS AND COLLECTION OF AMBIENT DATA

Contractor: UCR **ARB mgr:** ASH LASHGARI **Total:** $128,638 **Completion Date:** 1/30/02

Objective: The objectives of this project are to develop new operating and quality control procedures for measuring NOY and develop a new thermal evolution denuder method to measure nitric acid. Once these protocols are established, environmental chambers will be used to test the validity of the processes and four chemiluminescent NOY instruments will be deployed for field testing. If deficiencies in the difference method for measuring nitric acid can be remedied, the nitric acid instrumentation incorporating the necessary modifications will also be deployed.

98-344 **Title:** ULTRALOW NOx BURNER FOR PRECESS HEATERS AND INDUSTRIAL AND UTILITY BOILERS

Contractor: ALTEX TECHNOLOGIES **ARB mgr:** RALPH PROPPER **Total:** $327,914 **Completion Date:** 12/30/01

Objective: To develop ultralow NOx burner to reduce NOx emissions from conventional boilers.

98-345 **Title:** COMMERCIAL COOKING GREASE EMISSIONS CONTROL: MICROWAVE-CLEANED CERAMIC FILTER TECHNOLOGY COMMERCIALIZATION

Contractor: INDUSTRIAL CERAMIC SOLUTIONS, LLC **ARB mgr:** STEVE CHURCH **Total:** $338,007 **Completion Date:** 12/30/01

Objective: To develop a microwave cleaned ceramic filter to reduce commercial cooking grease emissions.

98-346 **Title:** ADVANCED ZEOLITE CONCENTRATORFOR CONTROL OF VOC EMISSIONS

Contractor: ALZETA CORPORATION **ARB mgr:** STEVE CHURCH **Total:** $332,985 **Completion Date:** 12/30/01

Objective: To develop a graded cell wheel structure for increased VOC adsorption leading to improvements in both removal efficiency and concentration ratios.

98-348 **Title:** Near-Source Exposure to Crystalline Silica and Fine Mineral Fibers in CA

Contractor: UCD **ARB mgr:** NEHZAT MOTALLEBI **Total:** $249,970 **Completion Date:** 12/30/02

Objective: Ambient concentrations of crystalline silica and man-made fine mineral fibers in the air need to be measured at sampling sites, using selected emission and population exposure criteria for "inhalable" particulate matter. In this study, the emissions of these air pollutants from the tested facilities and the impact of these emissions on the near receptors will be characterized. It is very important to distinguish between anthropogenic emissions and the natural sources of these pollutants so that the relative impacts on local concentrations can be identified.

99-302 **Title:** EVALUATION OF HEALTH IMPACTS OF MULTIPLE TOXIC AIR POLLUTANTS IN A SOUTHERN CALIFORNIA COMMUNITY: A PILOT STUDY

Contractor: UCI **ARB mgr:** Diane Mitchell **Total:** $270,017 **Completion Date:** 6/13/01

Objective: The proposal has two main objectives: 1) to examine the relationship between the daily occurrence and severity of asthma symptoms in children and adolescents with moderate asthma and concentrations of VOCs measured in breath samples and at an outdoor stationary monitoring site; 2) to determine the statistical associations between exhaled breath concentrations of VOCs, from the subjects described above, and VOC concentrations measured at the outdoor stationary site.

99-305 **Title:** The Creation of a Single, Level 1.0 and Level 2.0 Validated Radar Profiler Wind and RASS Virtual Temperature SCOS97 Database

Contractor: NOAA **ARB mgr:** Jim Pederson **Total:** $346,593 **Completion Date:** 1/13/02

Objective: To: 1) correct the data for possible improper orientation of the antennae or time reporting; 2) merge the low-and high-mode data sets through gridding into one comprehensive data set; 3) convert the refined data set to STICDF format; 4) compare and evaluate the performance of the data sets resulting from the two different data processing algorithms; and 5) create one data set each for winds and temperature based on objective 4.

99-306 **Title:** The Creation of a Single, Level 1.0 and Level 2.0 Validated Radar Profiler Wind and RASS Virtual Temperature SCOS97 Database

Contractor: Parson Engineering Science, Inc **ARB mgr:** Jim Pederson **Total:** $54,061 **Completion Date:** 12/9/01

Objective: To: 1)identify any problems with antennae alignment and standardize the time base for measurements from all sources; 2) evaluate the different data processing algorithms by comparing results with nearby rawinsonde data; and 3) reanalyze the original audit results, based on the final validated data set.

99-307 **Title:** The Creation of a Single, Level 1.0 and Level 2.0 Validated Radar Profiler Wind and RASS Virtual Temperature SCOS97 Database

Contractor: SCAQMD/STI **ARB mgr:** Jim Pederson **Total:** $128,806 **Completion Date:** 10/30/01

Objective: To: 1)coordinate work and information exchange among various participants; 2) reformat and merge surface meteorological data; 3) bring the remote sensing data up to Level 1 quality through expert review; 4) bring the remote sensing data up to Level 2 quality for 30 days of high interest to ARB; and 5) produce a data volume that includes descriptors of the data quality.

99-314 **Title:** Mechanisms of Particulate Toxicity: Health Effects in Susceptible Human

Contractor: UCSF **ARB mgr:** Deborah Drechsler **Total:** $409,937 **Completion Date:** 6/15/03

Objective: To determine the effect(s) of inhaled particles alone and in combination with ozone; particle size, and dose on inhaled particle on air inflammation, cellular functions, pulmonary function, and cardiovascular effects in mildly asthmatic volunteers.

99-315 **Title:** Mechanisms of Particulate Toxicity Effects on the Respiratory System of Sensitive Animals and Asthmatic Humans

Contractor: UCD **ARB mgr:** Barbara Weller **Total:** $567,529 **Completion Date:** 7/9/03

Objective: To: (1) determine the lung toxicity of short-term exposure in rats; (2) identify those endpoints that demonstrate a significant cellular/physiological response and have the potential to define the mechanisms of acute toxicity following exposure to PM in normal and sensitized rats; (3) examine the time frame in neonatal and juvenile rats which demonstrates the strongest acute biological response following sensitization; (4) compare the degree of lung toxicity and pattern of response to particle exposure in neonatal and juvenile rats; and (5) examine the inflammatory, cytokine, and cellular response in lung biopsy tissues obtained from asthmatic human

99-316 **Title:** Mechanisms of Particulate Toxicity Systemic Effects in Sensitive Animal Models and Susceptible Humans

Contractor: UCI **ARB mgr:** Barbara Weller **Total:** $231,982 **Completion Date:** 7/9/03

Objective: To provide technical expertise and physical support for particle generation and exposure characterization in human clinical exposure studies under contract 99-314; carry out essential analyses of tissue samples collected during the human clinical exposures and the sensitive animal exposures under contract 99-315; examine the health effects of atmospheric mixtures of particles in California air; determine the mechanisms that mediate lung injury and other adverse effects of inhaled particles in sensitive senescent animal models; and determine whether these mechanisms of injury are particle size dependant.

99-317 **Title:** Revegetation in the Antelope Valley for Particulate Matter Mitigation

Contractor: UCR **ARB mgr:** TONY VANCUREN **Total:** $29,956 **Completion Date:** 6/21/01

Objective: This project will focus on factors of plant stress to understand what controls plant establishment and growth on fallow farmland. There are three task areas: 1) fabricate and deploy instrument setups to measure temperature and relative humidity within and near the plant canopy; 2) measure liquid water (rain, dew on leaves, and soil moisture), available to plants through the growing season, and 3) monitor photosynthesis to assess plant health through the growing season.

99-318 **Title:** Determination of Nonregistration Rates for On-Road Vehicles in California

Contractor: UCR/CE-CERT **ARB mgr:** Hector Maldonado **Total:** $210,000 **Completion Date:** 11/9/01

Objective: To determine the number of non-registered light-duty vehicles operating in California and then, using the resulting data, attempt to determine the emissions impact of these vehicles

99-319 **Title:** Validation of Concentrations Estimated from Air Dispersion Modeling for Source-Receptor Distances of Less than 100 Meters

Contractor: UCR **ARB mgr:** Jim Pederson **Total:** $150,000 **Completion Date:** 8/9/02

Objective: To provide a well-tested dispersion model, supported by robust observations, suitable for estimating pollutant concentrations at source-receptor distances of less than 100 meters, for the full range of meteorological conditions needed to estimate annual average concentrations for common modeling scenarios that usually include the presence of obstacles, such as buildings.

99-322 **Title:** Responses in Asthmatic Children to Short-term Fluctuations in Particulate Air Pollution: Implications for Asthma Natural History - Part A

Contractor: UCB **ARB mgr:** Helene Margolis **Total:** $1,976,053 **Completion Date:** 2/14/03

Objective: To: 1) more precisely define the role(s) that different components of PM, in combination with other pollutants, play in the acute respiratory responses occurring in asthmatic children residing in the Fresno area; and 2) determine how those acute responses influence the progression of the disease over multiple growth years.

99-323 **Title:** Responses to Short-term Fluctuations in Particulate Air Pollution in Asthmatic Children: Implications for Asthma Natural History - Part B

Contractor: UCB **ARB mgr:** Helene Margolis **Total:** $1,906,974 **Completion Date:** 6/29/03

Objective: To: 1) more precisely define the role(s) that different components of PM, in combination with other ambient air pollutants, play in the acute respiratory responses occurring in asthmatic children residing in the greater Fresno area; and 2) determine how those acute responses influence the progression of the disease over multiple critical growth years. The specific overall objective of this project is to develop daily exposure estimates for each of the 450 asthmatic children throughout their participation in the 5-year health study.

99-326 **Title:** Demonstration of the High Volume Collection System for Direct Measurement of Mass Emission Rates of Hydrocarbon Leaks

Contractor: UCB **ARB mgr:** Steve Church **Total:** $109,000 **Completion Date:** 6/30/02

Objective: The study will demonstrate the HVCS as an acceptable method for direct measurement of mass emission rates of fugitive hydrocarbon leaks.

99-327 **Title:** Refinement and Demonstration of a New Indoor Continuous Nitrogen Dioxide Monitor

Contractor: Battelle **ARB mgr:** **Total:** $89,947 **Completion Date:** 9/14/02

Objective: To refine indoor NO2 /HONO monitors recently developed under ARB funding; to build three additional monitors; to document the accuracy, reliability, and ease of use of the improved models by using them in California field studies in progress; and train ARB staff in the use and maintenance of the monitors.